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REPLACES BY  
PAT 34 1000

VERIFICATION OF TRANSLATION

I, LESLEY PAMELA BARNES

Of 14 HOLBROOK CLOSE, GT WALDINGFIELD, SUDBURY, SUFFOLK UK

Declare as follows:

1. That I am well acquainted with both the English and German languages, and
2. That the attached document is a true and correct translation made by me to the best of my knowledge and belief of:
  - a) Amended claims filed in respect of International Patent Specification PCT/DE00/03052

.....11 FEBRUARY 2002.....

*Lesley P. Barnes*

## CLAIMS

1. Cable or Bowden cable window lifter for motor vehicles having at least one guide rail (2, 2') with a  
5 longitudinally aligned slot (20, 20') and mounted on a carrier plate (1) of a motor vehicle door, a carrier (3, 3') holding a window pane and displaceable along the guide rail (2, 2'), wherein the carrier bears at least in part against the outside (21) and the inside (22) of the guide  
10 rail (2, 2') and engages through the slot (20, 20'), reversing devices (5, 5'; 6, 6') mounted at the ends of the guide rail (2, 2'), and a cable (8) in active connection with the carrier (3, 3') and with a drive device (7, 70) and guided over the reversing device,

15

**characterised in that**

the guide rail (2, 2') is shaped out from the base surface (B) of the carrier plate (1) and that the open side of the  
20 guide rail (2, 2') shaped out from the base surface (B) or the base surface (B) is covered sealed against moisture.

2. Window lifter according to claim 1 **characterised in**  
25 **that** the cover (9) is designed flat and is mounted in the plane of the base surface (B) of the carrier plate (1) or the guide rail (2, 2').

30 3. Window lifter according to claim 2 **characterised in**  
**that** the cover (9) is part of the door inside trim of the vehicle door.

4. Window lifter according to at least one of the preceding claims **characterised in that** the cover is made from a lining preferably formed as a foil or foam plastics layer which completely covers the surface of the carrier plate (1) and serves as sound insulation and/or protection against corrosion.

5. Window lifter according to claim 1 or 2 **characterised in that** the cover comprises a permanent adhesive strip (9).

6. Window lifter according to claim 1 or 2 **characterised in that** the cover consists of a shaped part (10) inserted into the inside (22) of the guide rail (2, 2').

7. Window lifter according to claim 1 or 2 **characterised in that** the cover consists of a shaped member (11) connected to the carrier plate (1) and resting on the edges of the carrier plate (1) which adjoin the guide rail (2, 2').

8. Window lifter according to claim 1 or 2 **characterised in that** the cover consists of a shaped member (12) which can be inserted by side projections (121, 122) into grooves (21, 22) of the guide rail (2, 2') which is shaped out of the base surface (B) of the carrier plate (1), or in grooves, slots or hooks on the carrier plate (1), and has a cable socket (123) for guiding the cable (8).

9. Window lifter according to claims 6, 7 or 8 **characterised in that** the shaped part (10) or shaped member (11) consists of a moulded plastics part or member.

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10. Window lifter according to at least one of the preceding claims **characterised in that** the carrier (3, 3') is formed in two parts and that the one part (31) of the carrier (3, 3') bears against the outside (21) of the guide rail (2, 2') and the other part (32) of the carrier (3, 3') bears against the inside (22) of the guide rail (2, 2').

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11. Window lifter according to claim 10 **characterised in that** the carrier (3, 3') is divided in the region of the cable nipple chamber (36) and has two openings (41, 41'; 42, 42') above and below the cable nipple chamber (36) for holding the counter member which forms the second part (32) of the carrier (3, 3').

12. Window lifter according to claim 11 **characterised in that** the counter member (32) is made from a sheet metal angle (45) with a plastics insert (46).

13. Window lifter according to at least one of the preceding claims 1 to 9 **characterised in that** the carrier (3, 3') is formed in one piece, that the part (33) of the carrier (3, 3') bearing against the outside (21) of the guide rail (2, 2') is connected to the cable (8) and that the part (34) of the carrier (3, 3') bearing against the inside (22) of the guide rail (2, 2') is shaped so that the carrier (3, 3') can be inserted in the slot (20) of

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the guide rail (2, 2') and can be connected with keyed engagement with the guide rail (2, 2') whilst displaceable in the longitudinal direction of the guide rail (2, 2').

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14. Window lifter according to claim 13 **characterised in that** the cable (8) is connected eccentrically to the carrier (3, 3').

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15. Window lifter according to claim 14 **characterised in that** the cable (8) is connected to the carrier (3, 3') outside of the guide surface produced by the stamping of the guide rail (2, 2').

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16. Window lifter according to at least one of the preceding claims 1 to 9 **characterised in that** the carrier (3, 3') is formed in one piece and has a longitudinal fixing and slide region (30) which after pushing through the slot (20) of the guide rail (2, 2') and turning the through axis (300) about the transverse axis of the one-piece carrier (3, 3') bears on the outside and inside respectively against the edges of the guide rail (2, 2') which adjoin the slot (20) of the guide rail (2, 2').

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17. Window lifter according to at least one of the preceding claims **characterised in that** the cable (8) is connected centrally relative to the carrier (3, 3') to its cable nipple chamber (36).

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18. Cable window lifter according to at least one of the preceding claims for curved carrier plates **characterised in that** the cable (8) running between the reversing devices (5, 5'; 6, 6') does not intersect the base surface  
5 (B) of the carrier plate (1).

19. Window lifter according to at least one of the preceding claims for curved carrier plates, **characterised**  
10 **in that** the cable (8) running between the reversing devices (5, 5'; 6, 6') intersects the base surface (B) of the carrier plate (1) at least in parts and that the cover (9) is formed so that it does not contact the cable (8) at any point.

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20. Window lifter according to at least one of the preceding claims **characterised in that** the upper and lower end regions (2a, 2a'; 2b, 2b') of the guide rails (2, 2')  
20 are formed like ramps.

21. Window lifter according to at least one of the preceding claims **characterised in that** the guide rails (2,  
25 2') are formed curved in the longitudinal direction relative to the base surface of the carrier plate (1).

22. Window lifter according to at least one of the preceding claims **characterised in that** the carrier plate  
30 (1) is provided with additional guide slots and/or guide elements shaped out of the base surface (B) of the carrier plate (1) to hold slide or fixing elements connected to structural parts of elements of a vehicle door, more  
35 particularly arm rests.

23. Window lifter according to at least one of the preceding claims **characterised in that** the imprint of the guide rail (2, 2') is formed by deep drawing or stamping a  
5 metal carrier plate (1) or by injection moulding or thermo-shaping a plastics carrier plate (1).

24. Window lifter according to at least one of the  
10 preceding claims **characterised in that** the side edges of the carrier plate (1) are connected sealed against moisture to a carrier plate socket of the vehicle door.



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METHOD AND DEVICE FOR CONNECTING A COMPONENT PART TO A  
SUPPORT ELEMENT OF A VEHICLE

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DESCRIPTION

20 The invention relates to a device and method for  
connecting a component part provided with an assembly or  
connecting opening to a support element of a motor  
vehicle, more particularly to a support plate of a vehicle  
door module.

25 In order to fix component parts on a support element such  
as for example a support plate or a door module it is  
standard to use connecting elements such as screws,  
rivets, clips and the like with which the relevant  
component part is fixed on the support element. This type  
30 of fixing requires however additional connecting elements,

causes for example when using blind rivets additional waste and requires additional assembly time and corresponding assembly costs for aligning, adjusting and attaching the component part.

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When manufacturing and assembling movable devices for motor vehicles it is often necessary to connect a component part, which has a tubular section (e.g. a stepped bolt) and which is provided for example for rotary mounting a gearbox element, cable roller or the like, to a further component part (e.g. a holding angle).

To this end it is known from DE OS 41 31 098 to use a multi-stepped axle bolt which is fixed by means of rivet elements on a holding angle, for the rotatable bearing of the guide pulley of a cable window lifter. A bore provided in the axle bolt serves to fix the entire structural group (axle bolt, guide pulley, holding angle and where applicable further components ) on a vehicle plate.

The known method for fixing an axle bolt on a holding angle has the drawback that additional rivets or other fixing elements are required and an additional work step is necessary to attach and where applicable deform the fixing element.

Furthermore when manufacturing and fitting movable devices for motor vehicles it is often necessary to connect two sheet metal parts together.

So-called through seaming techniques are known to connect sheet metal parts whereby a positive connection is produced between the two sheet metal parts by re-shaping local plastics materials whereby the use of additional connecting means (e.g. rivets) becomes unnecessary. These through seaming techniques however have the drawback that they require an expensive apparatus to pre-fit the sheet metal parts which are to be connected so that these can be aligned relative to each other so that they adjoin one another along the desired contact bearing faces.

A further drawback exists in that it is difficult to check the quality of the connections produced since access to carry out a visible check on the areas of the two sheet metal parts which positively engage in each other is difficult.

From DE 44 17 279 A1 a method is known for positively connecting two component parts of movable devices for motor vehicles of which one has a tubular section which is provided for the rotatable or rotationally fixed bearing of a further part. The tubular section of the first component part is guided in an opening of the second component part provided for this purpose and exerts on the tubular section a force in the axial direction through which the tubular section becomes compressed in a partial area so that the compressed area of the tubular section produces a positive locking connection with the second component part. The cable pulley of a window lifter can be mounted for example on the non-deformed axial partial section of the first component part.

The known method allows a simple quick and easy production of a direct durable connection between two component parts wherein however one of the two component parts is  
5 permanently deformed.

When fitting component parts on a support plate or door module of a motor vehicle care is to be taken that the moisture-tight separation between the wet cell and dry  
10 cell of a door is not broken since moisture-sensitive component parts in the dry cell of the vehicle door could be damaged or suffer impaired function.

Furthermore constructing structural groups or  
15 incorporating them in other systems with an increasing number of individual elements basically entails further disadvantages. These not only include increased expense for handling but also give rise to faults in fitting and assembling. A large number of parts often requires  
20 additional measures for compensating tolerances, for example through oblong hole guides, or a very high precision during manufacture, which is again very cost-intensive.

25 Furthermore it is desirable with the minimum weight, particularly of a door module to obtain maximum stability preferably maximum side impact stability. These contradicting demands can only be met with special technical measures such as reinforcement impressions which  
30 however again severely restrict the possibilities when fitting the component parts which are to be connected to a support element.

The object of the present invention is therefore to provide a device and method of the kind mentioned above wherein no additional connecting elements or separate distance-bridging means and no measures for compensating tolerance are required, which cause less assembly time and costs, where applicable guarantee a water and pressure tight connection on the support element and which allow a reduction in the work steps and further ensure a saving in weight and an increase in the stability, more particularly the side impact stability.

This is achieved according to the invention through a device with the features of claim 1.

The method for solving the problem is characterised by the features of claim 14.

The solution according to the invention allows component parts to be fixed or attached and guided on a support element, more particularly a vehicle door, without additional connection elements or separate distance-bridging means as well as no measures for compensating tolerances, guarantees a minimum assembly time and minimum assembly costs and ensures in various different embodiments that the closed contour of the support plate or door module is not broken by the guide or fastening of the component parts so that with these embodiments no additional seals are required between the support element and the guided or fastened component part.

Furthermore the solution according to the invention allows a reduction in the work steps and a reduction in the weight whilst at the same time increasing the stability, more particularly the side impact stability. Thus when using thinner sheet metal plates an improved mechanical load bearing capacity can be achieved, more particularly a strength which can be adapted to concrete conditions.

- 10 An advantageous development of the solution according to the invention is characterised in that the dished shape of the support element is deep drawn or imprinted.

Preferably the box or channel like dish shape is provided with a reduction in the cross section for an ideal reshaping area or an ideal reshaping point which divides the dish shape into a deformation area and a support or guide area. The deformation area is deformed additionally before or after attaching the component part.

20

Furthermore the deformation area can be compressed to form a lens-shaped head or a channel which is box-shape in cross-section, opens like a duct and has semi-circular end sides. In order to form a plate-shaped head with a fold adjoining the guide or support area the lens-shaped area or the box-section channel is further deformed.

By imprinting guide rails for the entrainment member of a window pane of a cable or Bowden window lifter into the support element (support plate) and thus by integrating the guide rails into the support element a one-piece arrangement is achieved instead of the otherwise three-

part arrangement with left and right guide rails as well as separate support plate for holding the guide rails and drive means of a cable or Bowden window lifter.

- 5 This embodiment furthermore allows narrower tolerances to be observed by a one-step manufacture with defined distances or defined association between the left and right guide rails.
- 10 At least one guide rail and the support element can be designed as an integral structural unit which forms together with further function elements of a motor vehicle door, such as door lock, electric locking, cable tree, window lifter drive and the like, one vehicle door module.
- 15 The guide rails can thereby selectively form the edge area of the support element or can be worked into the surface of the support element.
- 20 Furthermore the ends of the guide rails can have breaks in the material to hold the cable pulley member or to mount the cable pulleys, more particularly nozzle openings and/or dish-shaped impressions.
- 25 A further advantageous design of the solution according to the invention is characterised in that the support element has several interconnected imprinted or deep-drawn areas which preferably serve to hold, guide and /or cover component parts and to increase the stiffness of the
- 30 support element.

Through this design of the solution according to the invention an open system is possible by integrating reinforcement imprints which are not possible in the case of a three-part design of a cable or Bowden window lifter having a left and right guide rail as well as a support plate for holding the guide rails and the drive device. A clear reduction in weight by using thinner materials whilst simultaneously increasing the side impact stiffness is now obtained.

Various embodiments and examples of the method according to the invention and the device according to the invention are shown in the drawings in which:

Figure 1 shows a cross-sectional view of a dished impression in a support plate with a moulded deformation area;

Figure 2 shows the fixing of a structural element on a support plate provided with a dished impression;

Figure 3 shows a diagrammatic perspective illustration of a channel-shaped dished impression by deforming a support plate;

Figure 4 shows the attachment of an entrainment member of a cable window lifter on a support plate provided with a T-shaped deformation;

Figure 5 shows the connection of a cable pulley with a deformed support plate;



Figure 6 shows a diagrammatic perspective view of a door module having a cable window lifter whose fastening is shaped out of the support plate of the door module;

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Figure 7 is a cross-sectional and

Figure 8 is a diagrammatic perspective view of a support plate with integrated reinforcement impressions and guide rails for a single and double strand cable or Bowden window lifter.

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Figures 1A to 1C show in cross section and plan view two stages when producing a positive locking connection for structural elements on a support plate.

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In a first production stage according to Figure 1A the support plate 1 is imprinted or deep drawn so that a dish-shaped impression 2 is provided on which a component part provided with a bore or the like can be axially fitted. By making an ideal re-shaping area 3 in the form of a reduction in the cross-section or the like the dish-shaped impression 2 is divided into a deformation area 21 and a guide or support area 24.

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The guide or support area 24 defines the support height H which corresponds to the thickness or depth of the socket bore of the component part which is to be fixed.

Figure 1B shows the further deformation of the deformation area 21, which by way of example is cylindrical in Figure 1, by applying a compressive force onto the dish-shaped impression 2 so that a lens or mushroom shaped head 22 is formed on which a component part having an elastic or snap-fitting socket opening can be fitted after deformation of the support element 1 or in the case of a component part fitted on prior to deformation according to Figure 1B can be secured in its position.

Figures 2A to 2C show the connection of a component part 4 with a support plate 1 in the various phases of producing a positive locking connection.

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Figure 2A shows the support plate 1 which is provided with a dished impression 2 and whose deformation area 21 is formed cylindrical with a curved cover face. By providing an ideal re-shaping area 3 the dished impression 2 is divided into the deformation area 21 and the guide or support area 24. In this deformation stage of the support plate 1 a washer 40 and the component part 4 provided with a corresponding bore are fitted onto the deformation area 21 of the support plate 1 so that the side of the component part 4 remote from the support plate 1 closes with the support or guide level of the guide area 24.

By deforming the deformation area 21 of the dished impression 2 according to Figure 2B a lens or mushroom shaped head 22 is produced out of the dished impression 2 which in this form is already sufficient to secure the component part 4 in position. Through further deformation of the head 22 the dished impression 2 is brought into

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flush alignment with the top of the component part 4 so that a cylindrical guide channel 24 and a circular disc shaped positioning and securing surface 23 are obtained.

- 5 The dished impressions according to Figures 1 and 2 serve to hold and secure in position various types of component parts such as assemblies, guide elements, lock supports, speakers or the like which are preferably mounted in the dry area of a motor vehicle door whereby the support plate  
10 or door module 1 produces the separation between the wet and dry cells of the vehicle door.

In the same way elongated (channel-like) socket profiles can also be formed in a support plate.

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Figures 3A to 3C show in a diagrammatic perspective view the various production stages of a fastening and connecting device of this kind.

- 20 According to Figure 3A a dished impression 25 has been created by impression or deep-drawing in the support plate 1 which corresponds to the dished impression according to Figures 1 and 2. By applying an ideal re-shaping area at a distance from the surface of the support plate 1 which  
25 corresponds to the support height or material thickness of the component part which is to be fixed and guided it is possible to determine the further deformation area of the curvature.

Figure 3B shows the fastening and securing area 26 deformed above the ideal re-shaping area as well as the support area 28 running underneath the ideal re-shaping area. In a following production stage according to Figure 5 3C the guide and securing area 26 can be further flattened and form a surface 27 running parallel to the support plate 1. A channel-shaped indentation with T-shaped securing and guide face 27 is thereby provided in the support plate 1.

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The deformation area thus formed in the support plate 1 of a motor vehicle door serves to fasten and guide component parts of for example a door module.

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Figures 4 to 6 show various different examples of use in a diagrammatic perspective view.

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Figure 4 shows the fastening profile produced according to Figure 3 in the support plate 1 of a door module on which an entrainment member 5 is fitted for a cable window lifter whose guide channel is adapted to the deformed dished impression 27 of the support plate 1. The support height 28 of the deformed dished impression forms a type of rail guide for the entrainment member 5 and is enclosed by the side guide elements 51 and 52 of the entrainment member 5 whose guide surface corresponds to a slit box section.

25

Figure 5 shows the fastening of a cable pulley 6 connected to a support element 7 on the deformed dished impression 27 of a support plate 1 whereby the support element 7 is fitted onto the deformed dished impression 27 of the support plate 1.

30

Figure 6 shows a support plate 1 with guide rails of a cable window lifter formed on its surface and thus on its inner area by dished impression or deep-drawing the support plate 1 and which serves at the same time to hold cable pulleys mounted on a support element.

Before fitting the support elements 71 to 74 having the cable pulleys 61 to 64 fixed thereon, entrainment members 51, 52 are fitted onto the guide rails 2a and 2b which are formed by dished impression for example according to Figure 3. The support elements 71 to 74 are then fitted onto the ends of the imprinted rails 2a, 2b and the cable 8 is placed round the cable pulleys 61 to 64 and connected to the entrainment members 51, 52.

The drive motor 9 can in this embodiment according to Figure 6 be connected to the support plate 1 in the manner illustrated in Figures 1 and 2.

The support plate 1 serves in the embodiment according to Figure 6 as a separation between the wet cell and dry cell of a vehicle door and thus provides a good seal between the wet and dry cells. Owing to the closed contour formed by deep drawing or dished impression a watertight separation is present so that no additional seal is required between the support plate 1 and the fastening areas or the component parts to be fixed, such as guide rails, guide pulleys or drive motor.

This and the following embodiment are particularly suitable for a motor vehicle door module if the one-piece structural unit of support plate and guide rails is equipped with further function elements of a vehicle door, such as door lock, electric locking, cable tree, window lifter drive and the like.

Figure 8 shows a diagrammatic perspective view of an imprinted more particularly deep drawn support plate with imprinted guide rails for entrainment members of a window pane of a cable or Bowden window lifter and Figure 7 shows a sectional view along the line A-A of Figure 8..

The imprinted support plate 1 consists of a deep-drawn sheet metal profiled section having several profiled sections at angles to each other. In the edge area, i.e. on the outer side edges of the support plate 1 there are guide rails 2c, 2d for the entrainment members 53, 54 for a window pane of a cable or Bowden cable window lifter which consist of guide faces 14, 15, 16 which are angled at right angles to each other. The entrainment members 53, 54 slide on these guide faces 14, 15, 16 of the guide rails 2c, 2d up and down depending on the pull direction of the window lifter cable or Bowden cable (not shown). The window lifter cable or Bowden cable is guided over cable pulleys 71, 72, 73, 74 whereby cable mountings arranged on the cable pulleys 71 to 74 serve to attach the Bowden cable sleeves. A motor gear unit 9 provided at a corresponding indentation with apertures 13 on the support plate 1 serves to drive the cable or Bowden cable window lifter.

The largest deep drawn areas are located in the area of the fixing point 10 of the support plate 1. They bridge the distance between the guide faces 14, 15, 16 of the guide rails 2c, 2d for the entrainment members 53, 54 of the window pane and the fixing of the support plate 1 and are substantially defined by a depth-setting surface 100, a surface 101 and a reinforcement setting 102.

The depth setting surface 100 has substantially the shape of an isosceles triangle whose obtuse angle adjoins the fixing area 10. The arm edges of the isosceles triangle form a connection between the surface 101 and the depth setting surface 100 whilst on the other side the base edge of the depth setting surface 100 marks the transition to the narrow guide face 16 for the entrainment member 53, 54.

The drawn-in material areas for the fastening point 10 of the support plate 1 can be shaped differently depending on which distances are to be bridged.

Through the one-piece design with the guide rails integrated in the support plate and the defined distances of the two guide rails 2c, 2d resulting from this it is possible to observe very narrow tolerances with a one-step production. Furthermore reinforcement impressions 11, 12 allow an open system as well as a weight reduction through the resulting stiffness achieved by the reinforcement impressions whereby thinner materials are used whilst at the same achieving high side impact strength.

The reinforcement impressions 11, 12 can also serve at the same time to hold and enclose Bowden cable sleeves or with a corresponding design to enclose the cable of a cable window lifter when corresponding guides or openings are provided for example to the motor gear unit 9 as well as to the guide pulleys 71 to 74.



ABSTRACT

Device for connecting component parts (entrainment members  
5 53, 54) having an assembly, guide and/or connecting  
opening to a support element (support plate 1) of a motor  
vehicle door, wherein the support plate (1) has at least  
one imprinted or deep-drawn deformation, support and/or  
guide area (guide rails 2c, 2d) for the positive-locking  
10 hold of the entrainment members 53, 54. The guide rails  
2c, 2d for the entrainment members 53, 54 of a window pane  
of a cable or Bowden cable window lifter are imprinted in  
the support plate 1 whereby the guide rails 2c, 2d and the  
support plate 1 are preferably designed as a one-piece  
15 structural unit which forms together with further function  
elements of a motor vehicle door, such as door lock,  
electric locking, cable tree, window lifter drive, one  
motor vehicle door module. A door module is thus produced  
which requires no additional connecting elements or  
20 separate distance-bridging means and no measures for  
compensating tolerances and which involves less assembly  
time and costs. (Figure 8).

10/088450

JC13 Rec'd PCT/PTO 14 MAR 2002

**ENGLISH TRANSLATION OF  
INTERNATIONAL APPLICATION  
WITH ANNEXES TO THE IPER  
INCORPORATED  
(PCT/EP00/03052)**

## PARTIAL TRANSLATIONS

DE 36 37 961 C1

Title: Raising device for lowerable window panes of motor vehicles

In a raising device for lowerable window panes of motor vehicles, in which a drive 8 moves a first pull means 9 and the latter moves a support part 12 which is connected to the window pane 7, the window pane 7, when being raised by the drive 8, is supported, in front of its upper end position, against tilting about an axis perpendicular to the window-pane surface via a second pull means 17 loading a second support part 16 connected releasably to the window pane 7. The raising device is arranged on a metal support member 3 showing integral guide rails 4, 5, 6 being punched into the support member 3.

FR 2 768 765

Title: Window raiser for motor vehicle

The cable (1) actuated lifter has a rail (2) to receive the cable and return guides (6) for the cable at each end of the rail. The return guides are each formed as a grooved ring formed integrally with the material of the rail.

Translation

## PATENT COOPERATION TREATY

PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

2

Applicant's or agent's file reference BRO 754 WO	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DE00/03052	International filing date (day/month/year) 01 September 2000 (01.09.00)	Priority date (day/month/year) 14 September 1999 (14.09.99)
International Patent Classification (IPC) or national classification and IPC E05F 11/48		
Applicant BROSE FAHRZEUGTEILE GMBH & CO. KG, COBURG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.	
2. This REPORT consists of a total of <u>5</u> sheets, including this cover sheet.	
<input checked="" type="checkbox"/>	This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
These annexes consist of a total of <u>8</u> sheets.	
3. This report contains indications relating to the following items:	
I <input checked="" type="checkbox"/>	Basis of the report
II <input type="checkbox"/>	Priority
III <input type="checkbox"/>	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV <input type="checkbox"/>	Lack of unity of invention
V <input checked="" type="checkbox"/>	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI <input type="checkbox"/>	Certain documents cited
VII <input checked="" type="checkbox"/>	Certain defects in the international application
VIII <input type="checkbox"/>	Certain observations on the international application

Date of submission of the demand 12 February 2001 (12.02.01)	Date of completion of this report 22 November 2001 (22.11.2001)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE00/03052

## I. Basis of the report

1. This report has been drawn on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

- ☐ the international application as originally filed.
- ☒ the description, pages 1-16, as originally filed,  
 pages \_\_\_\_\_, filed with the demand,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_.
- ☒ the claims, Nos. \_\_\_\_\_, as originally filed,  
 Nos. \_\_\_\_\_, as amended under Article 19,  
 Nos. \_\_\_\_\_, filed with the demand,  
 Nos. 2-22, filed with the letter of 19 September 2001 (19.09.2001),  
 Nos. 1, filed with the letter of 05 November 2001 (05.11.2001).
- ☒ the drawings, sheets/fig 1/8-8/8, as originally filed,  
 sheets/fig \_\_\_\_\_, filed with the demand,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_,  
 sheets/fig \_\_\_\_\_, filed with the letter of \_\_\_\_\_.

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☐ the claims, Nos. \_\_\_\_\_
- ☐ the drawings, sheets/fig \_\_\_\_\_

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

4. Additional observations, if necessary:

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE 00/03052

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	1-22	YES
	Claims		NO
Inventive step (IS)	Claims	1-22	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-22	YES
	Claims		NO

### 2. Citations and explanations

DE 36 37 961 C (D1) is considered to be the closest prior art in relation to the subject matter of Claim 1. It discloses a window lift for motor vehicles, with a mounting plate comprising guideway tracks for a carrier which retains the window glass.

In consequence the subject matter of Claim 1 differs from said known window lift in that the mounting plate itself acts as a barrier and a seal and in that the open sides of the guideway rails formed by the base plate of the mounting plate are covered, forming a moistureproof seal.

Thus, the problem addressed by the present invention can be considered to be that of devising a barrier to separate moist and dry areas, by simple means.

The solution according to the present invention is not obvious from the prior art.

Although D1 describes a mounting plate, said plate acts neither as a barrier nor as a seal.

/...

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DE 00/03052

WO 98/50658 (D2) discloses a window lift for a motor vehicle, with a mounting plate which does indeed act as a seal but is not configured with slots as guideway tracks.

Even a combination of D1 and D2 does not, in this case, lead in a straightforward and obvious manner to the subject matter as per Claim 1 since, with D2 as the starting point, a retaining slot does not lead to a sealed plate whilst, with D1 as the starting point, the plate could be enlarged to the full size of the door but to do so would necessitate the addition of further seals.

Claims 2-22 are dependent on Claim 1 and therefore likewise meet the requirements of the PCT in relation to novelty and inventive step.

The industrial applicability of the invention according to Claim 1 is evident.

In consequence, the application satisfies the criteria set out in PCT Article 33(1).

**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No.

PCT/DE 00/03502

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

The description has not been brought into line with the amended claims.

D1 is not discussed (PCT Rule 5.1(a)(ii)).

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# VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS

3 T

PCT

REC'D 27 NOV 2001

## INTERNATIONALER VORLÄUFIGER PRÜFUNGSBERICHT



(Artikel 36 und Regel 70 PCT)

Aktenzeichen des Anmelders oder Anwalts <b>BRO 754 WO</b>	<b>WEITERES VORGEHEN</b> siehe Mitteilung über die Übersendung des internationalen vorläufigen Prüfungsberichts (Formblatt PCT/IPEA/416)	
Internationales Aktenzeichen <b>PCT/DE00/03052</b>	Internationales Anmeldedatum (Tag/Monat/Jahr) <b>01/09/2000</b>	Prioritätsdatum (Tag/Monat/Tag) <b>14/09/1999</b>
Internationale Patentklassifikation (IPK) oder nationale Klassifikation und IPK <b>E05F11/48</b>		
Anmelder <b>BROSE FAHRZEUGTEILE GMBH &amp; CO. KG, COBURG et al.</b>		

- Dieser internationale vorläufige Prüfungsbericht wurde von der mit der internationalen vorläufigen Prüfung beauftragten Behörde erstellt und wird dem Anmelder gemäß Artikel 36 übermittelt.
- Dieser **BERICHT** umfaßt insgesamt 5 Blätter einschließlich dieses Deckblatts.  
  
☒ Außerdem liegen dem Bericht **ANLAGEN** bei; dabei handelt es sich um Blätter mit Beschreibungen, Ansprüchen und/oder Zeichnungen, die geändert wurden und diesem Bericht zugrunde liegen, und/oder Blätter mit vor dieser Behörde vorgenommenen Berichtigungen (siehe Regel 70.16 und Abschnitt 607 der Verwaltungsrichtlinien zum PCT).  
  
 Diese Anlagen umfassen insgesamt 8 Blätter.

3. Dieser Bericht enthält Angaben zu folgenden Punkten:

- I ☒ Grundlage des Berichts
- II ☐ Priorität
- III ☐ Keine Erstellung eines Gutachtens über Neuheit, erfinderische Tätigkeit und gewerbliche Anwendbarkeit
- IV ☐ Mangelnde Einheitlichkeit der Erfindung
- V ☒ Begründete Feststellung nach Artikel 35(2) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung
- VI ☐ Bestimmte angeführte Unterlagen
- VII ☒ Bestimmte Mängel der internationalen Anmeldung
- VIII ☐ Bestimmte Bemerkungen zur internationalen Anmeldung

Datum der Einreichung des Antrags  <b>12/02/2001</b>	Datum der Fertigstellung dieses Berichts  <b>22.11.2001</b>
Name und Postanschrift der mit der internationalen vorläufigen Prüfung beauftragten Behörde:   Europäisches Patentamt D-80298 München Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Bevollmächtigter Bediensteter  <b>Dorfstätter, M</b>  Tel. Nr. +49 89 2399 8133  

**I. Grundlage des Berichts**

1. Hinsichtlich der **Bestandteile** der internationalen Anmeldung (*Ersatzblätter, die dem Anmeldeamt auf eine Aufforderung nach Artikel 14 hin vorgelegt wurden, gelten im Rahmen dieses Berichts als "ursprünglich eingereicht" und sind ihm nicht beigelegt, weil sie keine Änderungen enthalten (Regeln 70.16 und 70.17)*):  
**Beschreibung, Seiten:**

1-16                      ursprüngliche Fassung

**Patentansprüche, Nr.:**

2-22                      eingegangen am                      19/09/2001    mit Schreiben vom                      18/09/2001

1                              eingegangen am                      05/11/2001    mit Schreiben vom                      05/11/2001

**Zeichnungen, Blätter:**

1/8-8/8                      ursprüngliche Fassung

2. Hinsichtlich der **Sprache**: Alle vorstehend genannten Bestandteile standen der Behörde in der Sprache, in der die internationale Anmeldung eingereicht worden ist, zur Verfügung oder wurden in dieser eingereicht, sofern unter diesem Punkt nichts anderes angegeben ist.

Die Bestandteile standen der Behörde in der Sprache: zur Verfügung bzw. wurden in dieser Sprache eingereicht; dabei handelt es sich um

- ☐ die Sprache der Übersetzung, die für die Zwecke der internationalen Recherche eingereicht worden ist (nach Regel 23.1(b)).
- ☐ die Veröffentlichungssprache der internationalen Anmeldung (nach Regel 48.3(b)).
- ☐ die Sprache der Übersetzung, die für die Zwecke der internationalen vorläufigen Prüfung eingereicht worden ist (nach Regel 55.2 und/oder 55.3).

3. Hinsichtlich der in der internationalen Anmeldung offenbarten **Nucleotid- und/oder Aminosäuresequenz** ist die internationale vorläufige Prüfung auf der Grundlage des Sequenzprotokolls durchgeführt worden, das:

- ☐ in der internationalen Anmeldung in schriftlicher Form enthalten ist.
- ☐ zusammen mit der internationalen Anmeldung in computerlesbarer Form eingereicht worden ist.
- ☐ bei der Behörde nachträglich in schriftlicher Form eingereicht worden ist.
- ☐ bei der Behörde nachträglich in computerlesbarer Form eingereicht worden ist.
- ☐ Die Erklärung, daß das nachträglich eingereichte schriftliche Sequenzprotokoll nicht über den Offenbarungsgehalt der internationalen Anmeldung im Anmeldezeitpunkt hinausgeht, wurde vorgelegt.
- ☐ Die Erklärung, daß die in computerlesbarer Form erfassten Informationen dem schriftlichen Sequenzprotokoll entsprechen, wurde vorgelegt.

4. Aufgrund der Änderungen sind folgende Unterlagen fortgefallen:

- ☐ Beschreibung,            Seiten:
- ☐ Ansprüche,                Nr.:
- ☐ Zeichnungen,            Blatt:

5. ☐ Dieser Bericht ist ohne Berücksichtigung (von einigen) der Änderungen erstellt worden, da diese aus den angegebenen Gründen nach Auffassung der Behörde über den Offenbarungsgehalt in der ursprünglich eingereichten Fassung hinausgehen (Regel 70.2(c)).

*(Auf Ersatzblätter, die solche Änderungen enthalten, ist unter Punkt 1 hinzuweisen; sie sind diesem Bericht beizufügen).*

6. Etwaige zusätzliche Bemerkungen:

**V. Begründete Feststellung nach Artikel 35(2) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung**

1. Feststellung

Neuheit (N)	Ja: Ansprüche	1-22
	Nein: Ansprüche	
Erfinderische Tätigkeit (ET)	Ja: Ansprüche	1-22
	Nein: Ansprüche	
Gewerbliche Anwendbarkeit (GA)	Ja: Ansprüche	1-22
	Nein: Ansprüche	

2. Unterlagen und Erklärungen  
**siehe Beiblatt**

**VII. Bestimmte Mängel der internationalen Anmeldung**

Es wurde festgestellt, daß die internationale Anmeldung nach Form oder Inhalt folgende Mängel aufweist:  
**siehe Beiblatt**

**Zu Punkt V**

**Begründete Feststellung nach Artikel 35(2) hinsichtlich der Neuheit, der erfinderischen Tätigkeit und der gewerblichen Anwendbarkeit; Unterlagen und Erklärungen zur Stützung dieser Feststellung**

Das Dokument DE 36 37 961 C (D1) wird als nächstliegender Stand der Technik gegenüber dem Gegenstand des Anspruchs 1 angesehen. Es offenbart einen Fensterheber für Kraftfahrzeuge mit einer Trägerplatte mit Führungsbahnen für einen die Scheibe aufnehmenden Mitnehmer.

Der Gegenstand des Anspruchs 1 unterscheidet sich daher von diesem bekannten Fensterheber dadurch, dass die Trägerplatte selbst eine Trennungs- und Abdichtfunktion übernimmt und dass die offene Seite der aus der Basisfläche der Trägerplatte herausgeformten Führungsschienen feuchtigkeitsdicht abgedeckt sind.

Die mit der vorliegenden Erfindung zu lösende Aufgabe kann somit darin gesehen werden, dass mit einfachen Mitteln eine Nass-/Trockenraumtrennung herstellbar ist.

Die erfindungsgemäße Lösung geht aus dem vorliegenden Stand der Technik nicht hervor.

D1 beschreibt eine Trägerplatte, die jedoch selbst keine Trennungs- oder Abdeckfunktion übernimmt.

Dokument WO 98/50658 (D2) zeigt einen Fensterheber für Kraftfahrzeuge mit einer Trägerplatte, die selbst zwar eine Abdichtfunktion übernimmt, jedoch nicht mit Schlitten als Führungsbahnen ausgeführt ist.

Selbst eine Kombination von D1 und D2 führt in diesem Fall nicht in naheliegender Weise zu einem Gegenstand gemäß Anspruch 1, da, ausgehend von D2, eine Aufnahme der Schlitze nicht zu einer abgedichteten Platte führt, und, ausgehend von D1, zwar die Platte auf volle Türgröße vergrößert werden könnte, dann aber noch zusätzliche Abdichtmaßnahmen notwendig wären.

Die Ansprüche 2-22 sind vom Anspruch 1 abhängig und erfüllen damit ebenfalls die

Erfordernisse des PCT in bezug auf Neuheit und erfinderische Tätigkeit.

Die gewerbliche Anwendbarkeit der Erfindung gemäß Anspruch 1 ist offensichtlich.

Daher erfüllt die Anmeldung die Kriterien von Artikel 33(1) PCT.

**Zu Punkt VII**

**Bestimmte Mängel der internationalen Anmeldung**

Die Beschreibung ist nicht an die geänderten Ansprüche angepasst.

Das Dokument D1 wurde nicht diskutiert (Regel 5.1(ii)).

1. Seil- oder Bowdenfensterheber für Kraftfahrzeuge mit mindestens einer an einer Trägerplatte (1) einer Kraftfahrzeugtür angeordneten, aus der Basisfläche (B) der Trägerplatte (1) herausgeformten Führungsschiene (2, 2') mit einem in ihrer Längsrichtung verlaufenden Schlitz (20, 20'), einem entlang der Führungsschiene (2, 2') verschiebbaren, eine Fensterscheibe aufnehmenden Mitnehmer (3, 3'), der zumindest teilweise an der Außenseite (21) und der Innenseite (22) der Führungsschiene (2, 2') anliegt und durch den Schlitz (20, 20') greift, an den Enden der Führungsschiene (2, 2') angeordneten Umlenkeinrichtungen (5, 5'; 6, 6') und einem mit dem Mitnehmer (3, 3') und mit einer Antriebsvorrichtung (7, 70) wirkverbundenen und über die Umlenkeinrichtung geführten Seil (8),

dadurch gekennzeichnet,

daß die Trägerplatte (1) selbst eine Trennungs- und Abdichtfunktion übernimmt und daß die offene Seite der aus der Basisfläche (B) der Trägerplatte (1) herausgeformten Führungsschienen (2, 2') feuchtigkeitsdicht abgedeckt ist.

EPO-BERLIN

05 -11- 2001

GEÄNDERTES BLATT

1. Seil- oder Bowdenfensterheber für Kraftfahrzeuge mit mindestens einer an einer Trägerplatte (1) einer Kraftfahrzeugtür angeordneten, aus der Basisfläche (B) der Trägerplatte (1) herausgeformten Führungsschiene (2, 2') mit einem in ihrer Längsrichtung verlaufenden Schlitz (20, 20'), einem entlang der Führungsschiene (2, 2') verschiebbaren, eine Fensterscheibe aufnehmenden Mitnehmer (3, 3'), der zumindest teilweise an der Außenseite (21) und der Innenseite (22) der Führungsschiene (2, 2') anliegt und durch den Schlitz (20, 20') greift, an den Enden der Führungsschiene (2, 2') angeordneten Umlenkeinrichtungen (5, 5'; 6, 6') und einem mit dem Mitnehmer (3, 3') und mit einer Antriebsvorrichtung (7, 70) wirkverbundenen und über die Umlenkeinrichtung geführten Seil (8),

**dadurch gekennzeichnet,**

daß die offene Seite der aus der Basisfläche (B) herausgeformten Führungsschiene (2, 2') feuchtigkeitsdicht abgedeckt ist.

2. Fensterheber nach Anspruch 1, **dadurch gekennzeichnet,** daß die Abdeckung (9) eben ausgebildet und in der Ebene der Basisfläche (B) der Trägerplatte (1) bzw. der Führungsschiene (2, 2') angeordnet ist.

3. Fensterheber nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß die Abdeckung aus einem Dauerklebestreifen (9) besteht.
4. Fensterheber nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß die Abdeckung aus einem in die Innenseite (22) der Führungsschiene (2, 2') eingesetzten Formteil (10) besteht.
5. Fensterheber nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß die Abdeckung aus einem auf den an die Führungsschiene (2, 2') angrenzenden Rändern der Trägerplatte (1) aufliegenden und mit der Trägerplatte (1) verbundenen Formstück (11) besteht.
6. Fensterheber nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß die Abdeckung aus einem Formstück (12) besteht, das mit seitlichen Vorsprüngen (121, 122) in Nuten (21, 22) der aus der Basissfläche (B) der Trägerplatte (1) herausgeformten Führungsschiene (2, 2') oder in Nuten, Schlitze oder Haken an der Trägerplatte (1) einsetzbar ist und eine Seilaufnahme (123) zur Führung des Seils (8) aufweist.



7. Fensterheber nach den Ansprüchen 4, 5 oder 6, **dadurch gekennzeichnet**, daß das Formteil (10) oder Formstück (11) aus einem Kunststoff-Formteil oder -stück besteht.
8. Fensterheber nach mindestens einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß der Mitnehmer (3, 3') zweiteilig ausgebildet ist und daß der eine Teil (31) des Mitnehmers (3, 3') an der Außenseite (21) der Führungsschiene (2, 2') und der andere Teil (32) des Mitnehmers (3, 3') an der Innenseite (22) der Führungsschiene (2, 2') anliegt.
9. Fensterheber nach Anspruch 8, **dadurch gekennzeichnet**, daß der Mitnehmer (3, 3') im Bereich der Seil-Nippelkammer (36) geteilt ist und zwei Öffnungen (41, 41'; 42, 42') oberhalb und unterhalb der Seil-Nippelkammer (36) zur Aufnahme des zweiten Teils (32) des Mitnehmers (3, 3') bildenden Gegenstücks aufweist.
10. Fensterheber nach Anspruch 9, **dadurch gekennzeichnet**, daß das Gegenstück (32) aus einem Blechwinkel (45) mit einer Kunststoffeinlage (46) besteht.

11. Fensterheber nach mindestens einem der voranstehenden Ansprüche 1 bis 7, **dadurch gekennzeichnet**, daß der Mitnehmer (3, 3') einteilig ausgebildet ist, daß der an der Außenseite (21) der Führungsschiene (2, 2') anliegende Teil (33) des Mitnehmers (3, 3') mit dem Seil (8) verbunden ist und daß der an der Innenseite (22) der Führungsschiene (2, 2') anliegende Teil (34) des Mitnehmers (3, 3') so geformt ist, daß der Mitnehmer (3, 3') in den Schlitz (20) der Führungsschiene (2, 2') einsetzbar und mit der Führungsschiene (2, 2') formschlüssig und in Längsrichtung der Führungsschiene (2, 2') verschieblich verbindbar ist.
12. Fensterheber nach Anspruch 11, **dadurch gekennzeichnet**, daß das Seil (8) außermittig mit dem Mitnehmer (3, 3') verbunden ist.
13. Fensterheber nach Anspruch 12, **dadurch gekennzeichnet**, daß das Seil (8) außerhalb der durch die Ausprägung der Führungsschiene (2, 2') gegebenen Führungsfläche mit dem Mitnehmer (3, 3') verbunden ist.
14. Fensterheber nach mindestens einem der voranstehenden Ansprüche 1 bis 7, **dadurch gekennzeichnet**, daß der Mitnehmer (3, 3') einteilig ausgebildet ist und einen länglichen Befestigungs- und Gleitbereich (30) aufweist, der nach dem Durchstecken durch den Schlitz (20) der Führungsschiene (2, 2') und Drehen der Durch-

steckachse (300) um die Querachse des einteiligen Mitnehmers (3, 3') an der Außenseite bzw. Innenseite an den Rändern der Führungsschiene (2, 2') anliegt, die an den Schlitz (20) der Führungsschiene (2, 2') angrenzen.

15. Fensterheber nach mindestens einem der voranstehenden Ansprüche, **dadurch gekennzeichnet**, daß das Seil (8) mittig zum Mitnehmer (3, 3') mit dessen Seil-Nippelkammer (36) verbunden ist.
16. Fensterheber nach mindestens einem der voranstehenden Ansprüche für gewölbte Trägerplatten, **dadurch gekennzeichnet**, daß das zwischen den Umlenkeinrichtungen (5, 5'; 6, 6') verlaufende Seil (8) die Basisfläche (B) der Trägerplatte (1) nicht schneidet.
17. Fensterheber nach mindestens einem der voranstehenden Ansprüche für gewölbte Trägerplatten, **dadurch gekennzeichnet**, daß das zwischen den Umlenkeinrichtungen (5, 5'; 6, 6') verlaufende Seil (8) die Basisfläche (B) der Trägerplatte (1) zumindest stellenweise schneidet und daß die Abdeckung (9) so ausgebildet ist, daß sie das Seil (8) an keiner Stelle berührt.

18. Fensterheber nach mindestens einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß der obere und untere Endbereich (2a, 2a'; 2b, 2b') der Führungsschienen (2, 2') rampenförmig ausgebildet ist.
19. Fensterheber nach mindestens einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß die Führungsschienen (2, 2') in Längsrichtung bogenförmig in Bezug auf die Basisfläche der Trägerplatte (1) geformt sind.
20. Fensterheber nach mindestens einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß in der Trägerplatte (1) zusätzliche Führungsschlitze und/oder aus der Basisfläche (B) der Trägerplatte (1) herausgeformte Führungselemente zur Aufnahme von mit Konstruktionsteilen von Elementen einer Fahrzeugsür, insbesondere von Armlehnen, verbundenen Gleit- oder Befestigungselementen vorgesehen sind.
21. Fensterheber nach mindestens einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß die Ausprägung der Führungsschiene (2, 2') durch Tiefziehen oder Stanzen einer metallischen Trägerplatte (1) oder durch Spritzgießen oder Thermoverformung einer Kunststoff-Trägerplatte (1) gebildet ist.

22. Fensterheber nach mindestens einem der vorangehenden Ansprüche, **dadurch gekennzeichnet**, daß die Seitenränder der Trägerplatte (1) feuchtigkeitsdicht mit einer Trägerplattenaufnahme der Kraftfahrzeugtür verbunden sind.

## CABLE OR BOWDEN CABLE WINDOW LIFTER

## Description

5 The invention relates to a cable or Bowden cable window lifter for motor vehicles according to the preamble of claim 1.

10 A cable or Bowden cable window lifter of the kind mentioned above is known from WO 98/50658 and contains an stamped, more particularly deep-drawn carrier plate with stamped guide rails for the carriers of a window pane. The stamped carrier plate consists of a deep-drawn sheet metal profiled section having several sections standing at  
15 angles to each other. Guide rails for the cable or Bowden cable window lifter are formed on the surface of the carrier plate by dish stamping or deep-drawing and serve at the same time to hold cable pulley rollers which are mounted on a support element.

20

Before fitting the support elements with the cable pulley rollers fixed thereon, the carriers are fitted onto the guide rails which are formed by dish stamping. The support elements are then pushed onto the ends of the  
25 stamped rails and the cable is placed round the cable guide pulleys and connected to the carriers. The carriers slide up or down on the guide rails depending on the pulling direction of the window lifter cable which is guided over the cable guide pulleys whereby if necessary  
30 cable mountings arranged on the cable guide pulleys serve to attach the Bowden cable sleeves. A motor-gear unit

- 2 -

which is provided at a suitable stamped area with apertures on the carrier plate serves to drive the cable of Bowden cable window lifter.

- 5 From US C 50 58 322 a cable window lifter is known having a manual drive with a guide rail with a slot running in the longitudinal direction of the guide rail through which a carrier engages which bears against both sides of the slot of the guide rail. Upper and lower fixing plates are  
10 provided at the ends of the guide rail with the guide pulleys arranged thereon. The guide rail itself is formed as a shaped sheet metal part which is fixed together with the upper and lower fixing plate in a vehicle door.
- 15 The object of the present invention is to provide a cable or Bowden cable window lifter of the kind mentioned in the preamble of claim 1 which ensures an exact geometric relationship between the individual parts of the window lifter in one manufacturing step, which allows simple  
20 manufacture and assembly as well as selectively a wet space design of a window lifter or wet and dry space separation of the window lifter with simple means and few manufacturing steps.
- 25 This is achieved through the features of claim 1.

The solution according to the invention provides an exact geometric relationship and alignment of the guide rails, the carriers guided thereon and the window pane fixed in  
30 the carriers in one manufacturing step, a simple production and assembly of the window lifter as well as when required a wet space design of the window lifter or a wet/dry space separation of the window lifter with simple means and in few manufacturing steps.

Starting from the cable or Bowden cable window lifter known from WO 98/50658 and having guide rails stamped in the surfaces of a carrier plate, the idea of the present invention is to configure the guide rails and integrate  
5 them into the carrier plate so that both a wet space design and also a wet/dry space separation of a cable or Bowden cable window lifter are possible and can be manufactured with simple means. Furthermore the stamping of the carrier plate is to be carried out in only few and  
10 preferably in only one work step, and the cable guide should be possible both centrally and also eccentrically in relation to the carriers without the need for structural alterations to the guide rails.

15 By shaping the at least one guide rail out from the base surface of the carrier plate with a slot running in the longitudinal direction of the thus shaped guide rail whereby the carrier bears against the outside and inside of the slot and engages through the slot as well as  
20 through the moisture-proof cover of the open side of the guide rail which is shaped out from the base surface of the carrier plate or through the moisture-proof cover of the base surface itself, both an exact guide of the individual parts of the window lifter and also a readily  
25 producible wet/dry space separation of the window lifter is now possible.

By simply covering the curved guide rail in the region of the base surface of the carrier plate it is possible to  
30 separate the wet and dry space of the window lifter with the simplest means and to ensure simple assembly and adjustment of the window lifter as well as when required to allow easy access to the individual parts of the cable or Bowden cable window lifter for maintenance or repair  
35 purposes.



The cover for the guide rail for separating the wet and dry space can be formed flat and can be arranged in the plane of the base surface of the carrier plate or guide rail. A flat cover of this kind can consist in the simplest form of a permanent adhesive strip or an adhesive foil which is fixed on the edges of the carrier plate adjoining the guide rail which is shaped out of the base surface.

10 As an alternative the cover can be formed as a part of the door inside trim of the vehicle door, that is can consist of a part which is shaped out correspondingly from the door inside trim and covers the guide rail which is shaped out of the base surface of the carrier plate. With this  
15 embodiment the number of parts is reduced and assembly costs are simplified.

Furthermore the cover can consist of a lining which is preferably formed from a foil or foam layer and serves as  
20 protection against corrosion or as sound insulation. The lining completely covers the carrier plate so that the cover fulfils a multi-functional purpose, namely that of separating the wet and dry space, guarding against corrosion and acting as sound insulation.

25 A further design of the cover for the guide rail for separating the wet and dry space comprises a shaped part inserted in the inside of the guide rail so that this type of cover not only acts to separate the wet and dry space  
30 but also as a result of its mechanically stable shape can also fulfil stabilising functions and where necessary support functions for the window lifter cable.

- 5 -

In order to support the window lifter cable the shaped part has a corresponding socket for the window lifter cable and is connected sufficiently securely to the carrier plate in which it is pushed for example in guide  
5 grooves of the carrier plate arranged at the side of the guide rail which is made out of the base surface, thereby producing a positive keyed connection with the carrier plate.

10 Furthermore there is the possibility of forming the carrier in one or more parts and of connecting the window lifter cable to the carrier so that it lies selectively inside the curvature or outside of the guide rail which is shaped out of the base surface of the carrier plate.

15 With a two-part design of the carrier the one part of the carrier lies against the outside of the guide rail and the other part of the carrier lies against the inside of the guide rail.

20 The carrier can be divided in the region of the cable nipple chamber and can have two openings above and below the cable nipple chamber to hold the counter member which forms the second part of the carrier and which preferably  
25 consists of a sheet metal angle with a plastics insert.

In a one-piece design the carrier has an oblong fixing or slide region which after pushing through the slot of the guide rail and turning about its transverse axis bears on  
30 the outside or inside against the edges which adjoin the slot of the guide rail. In this one-piece embodiment the carrier can be inserted in the guide rail anywhere along the guide slot and can be brought by turning about its transverse axis into engagement each side with the edges  
35 of the guide slot.

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The window lifter cable can be connected centrally relative to the carrier to its cable nipple chamber. If the cable never passes through the plane of the carrier plate irrespective of the position of the carrier a simple flat adhesive foil can be used as the cover.

If the cable running between the reversing device intersects the base surface of the carrier plate at least at some points then the cover is formed so that it at no point contacts the cable. This can be achieved through configuring the cover to have a curved cross-section.

Shaping out function elements for devices in a vehicle door such as shaping out guide rails for cable or Bowden cable window lifters is not the only purpose of use. Thus a guide slot can be provided in the carrier plate or a guide part shaped out of the base surface of the support plate, through which a slide element or fixing part is pushed and thereby connected, where necessary displaceable, to the carrier plate. The slide element or fixing part can be connected to an arm rest of the vehicle door directly or through fixing elements. Through a corresponding cover of a guide slot of this kind or a guide element shaped out of the base surface it is possible to ensure the required separation of the wet and dry space in the vehicle door and in order to fit an armrest it is possible to make corrections to the positioning during or after assembly to ensure the optimum position of the arm rest.

The ramp-shaped design of the upper and lower end region of the guide rails, i.e. the continuous rise of the shaping or stamping of the guide rails out from the base

surface of the carrier plate or the longitudinally curved formation of the guide rails ensures optimum cable guide and insertion into the reversing devices.

5 Shaping or stamping out the guide rail from the base surface of the carrier plate can be produced by deep drawing or by stamping a metal carrier plate or by injection moulding or thermo-shaping a plastics carrier plate.

10

In order also to ensure the wet and dry space separation in the side region of the carrier plate according to a further feature of the invention the side parts of the carrier plate are connected in moisture-proof manner to a  
15 carrier plate socket of the motor vehicle door.

The idea on which the invention is based will now be explained with reference to the embodiments illustrated in the drawings in which:

20

Figure 1 shows a diagrammatic perspective view of an stamped or deep-drawn carrier plate having integrated guide rails for a single or dual strand cable or Bowden cable window lifter;

25

Figures 2/3 are a plan view and inclined view respectively of a carrier plate with integrated guide rails, cable guide pulleys, reinforcing stamped regions and  
30 socket openings for component parts of a motor vehicle door or a door module;

Figures 4 to 7 shows cross-sectional views through a guide rail shaped out of the base surface of the carrier plate and single and two-part carriers connected to the guide rail;

5

Figure 8 shows a cross-sectional view through a guide rail shaped out from the base surface of a carrier plate and having side guide grooves and a cover connected with keyed engagement to the guide rail;

10

Figure 9 shows a plan view and cross-sectional view through a shaped guide rail and a carrier in two phases of the connection between the carrier and the guide rail;

15

Figure 10 shows a perspective view through a two-part carrier prior to connection of the two carrier parts; and

20

Figure 11 shows the two-part carrier according to Figure 10 in the assembled state.

25

The carrier plate 1 illustrated in Figure 1 has two guide rails 2, 2' which are shaped out from the base surface of the carrier plate 1 by stamping or deep drawing and on which carriers 3, 3' holding a window pane are mounted displaceable in the longitudinal direction of the guide rails 2, 2'. The carriers 3, 3' are connected to a cable 8 which is guided over cable guide pulleys 5, 5' in the region of the upper edge of the carrier plate 1 as well as cable guide pulleys 6, 6' in the region of the lower edge of the carrier plate 1. The cable is connected to a cable drum 70 which is driven by a motor gear unit 7.

30

The carriers 3, 3' are guided in a slot 20, 20' which is provided in the longitudinal direction of the stamped guide rails 2, 2' and - as will be explained in further detail below with reference to Figures 4 to 7 - bear  
5 against both the outside and inside of the shaped area of the guide rails 2, 2'.

Figure 1 shows a wet/dry space separation in the cable or Bowden cable window lifter since the moisture-sensitive  
10 motor gear unit 7 is mounted on the dry space side of the carrier plate 1 which is at the back in the viewing direction and is indicated by the arrow T, whilst the carriers 3, 3', the cable 8 and the cable drum 70 are provided on the wet space side which is indicated by arrow  
15 N and is located on the front side of the carrier plate 1 in the viewing direction. In order to separate the wet and dry spaces the cable drum 70 is connected to the motor gear unit 7 through a drive shaft which is pushed through a bore of the carrier plate 1, with the passage of the  
20 drive shaft through the carrier plate 1 being sealed off.

As can already be seen from the arrangement of the individual parts of the cable or Bowden cable window lifter according to Figure 1 the wet/dry space separation  
25 can be easily undertaken and guaranteed by simply covering the open base surface of the guide rails 2, 2' in the plane of the base surface of the carrier plate 1.

Through the one-piece embodiment with the guide rails 2, 2' shaped out of the base surface B of the carrier plate 1 and integrated in said carrier plate 1 and with the resulting defined spacing between the two guide rails 2, 2' it is possible to observe very close tolerances during production in only one work step. Furthermore the  
30 proposed reinforcing stamped regions which can be seen from the illustration of the carrier plate 1 in Figures 2

and 3 enable an open system and in addition as a result of the strengthening achieved through the reinforcing stamped regions a lighter weight construction by using thinner materials whilst maintaining at the same time a high  
5 resistance to side impacts.

The stamped or deep-drawn carrier plate 1 illustrated in front view in Figure 2 and in an inclined view in Figure 3 shows the formation of the carrier plate 1 as well as the  
10 different regions of the material structure which are formed by stamping or deep-drawing the base surface B of the carrier plate 1.

The guide rails 2, 2' which are shaped out and have a slot  
15 20, 20' running in the longitudinal direction thereof project out from the base surface B of the carrier plate 1. At the ends of the guide rails 2, 2' are the cable guide pulleys 5, 5' and 6, 6' which are arranged so that the cable is introduced into the slot 20, 20' and can be  
20 connected to the carriers which are mounted displaceable in the longitudinal direction of the guide rails 2, 2' which are shaped out from the base surface of the carrier plate 1. The surface of the carrier plate 1 which is located between the guide rails 2, 2' is shaped so that  
25 the cable of the cable or Bowden cable window lifter runs above the surface of the carrier plate 1 without contacting the carrier plate 1 and can be connected to the cable drum (not shown here) of the motor gear unit of the cable or Bowden cable window lifter.

30

For the optimum cable guide the upper and lower end regions 2a, 2a', and 2b, 2b' of the guide rails 2, 2' which are shaped out from the base surface of the carrier plate 1 are formed like ramps, i.e. starting from their  
35 ends they rise in these end regions continuously up to the shaped height, which is indicated by the compaction of the

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cross lines in the slot 20 and 20' up to the change into the cable guide pulleys 5,5' and 6, 6'.

Alternatively the guide rails shaped out from the base surface of the carrier plate 1 can be curved in the longitudinal direction, which likewise ensures an optimum cable guide and insertion into the reversing devices.

The stamped regions which can be seen from the illustrations of the carrier plate 1 in Figure 2 and 3 show the structuring of the carrier plate 1 where despite the reduced material thickness of the carrier plate 1 it has optimum strength particularly in relation to side impact forces.

Different regions (not shown in further detail) of the carrier plate 1 serve to hold, fix or position door component parts such as speakers, lock systems or the like.

Figure 4 shows a cross-section through a guide rail 2 shaped from the base surface of the carrier plate 1 along the line IV-IV according to Figure 1 with a slot 20 arranged in the apex of the shaped area and a two-part carrier 3 mounted on the arched guide rail 2 whereby the outer part 31 of this carrier bears against the outside 21 of the guide rail 2 and its inner part 32 bears against the inside 22 of the shaped area of the guide rail 2. A slot 35 in the outside and/or inside part 31, 32 of the two-part carrier 3 serves to receive and guide the cable 8 which is connected to the carrier 3 in a cable nipple chamber of said carrier 3.

A cover 9 is provided in the plane of the base surface B of the carrier plate 1 to separate the wet and dry space of the cable or Bowden cable window lifter. In the



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simplest case this cover can be a permanent adhesive strip of sufficient width which is stuck on the dry space side of the carrier plate 1 on the edges adjoining the guide rail 2 shaped out from the base surface of the carrier plate 1, thereby forming an effective moisture barrier in the region of the open base surface of the guide rail 2.

Figure 5 shows a cross-section through a guide rail 2 shaped out from the base surface of the carrier plate 1 and having a slot 20 formed in the apex of the shaped area and running in the longitudinal direction of the guide rail 2 to hold a one-piece carrier 3. The one-piece carrier 3 is shaped so that one part 33 of the carrier 3 bears against the outside of the guide rail 2 whilst the other part bears against the inside of the guide rail 2.

The inner part 34 of the one-piece carrier 3 and/or the part of the one-piece carrier 3 engaging through the slot 20 is configured so that the one-piece carrier 3 can be snap-fitted through the slot 20 into the guide rail 2 from outside the said guide rail 2 which is shaped out from the base surface of the carrier plate 1. By way of example this can be achieved by suitably shaping the inside part 34 and by inserting the one-piece carrier 3 into the slot 20 and then turning the carrier 3. Alternatively the one-piece carrier 3 can be inserted inclined into the slot 20 and then through a subsequent tilting action can be connected with keyed engagement with the guide rail 2 where it is displaceable in the longitudinal direction of same.

As opposed to the two-part carrier 3 illustrated in Figure 4 the one-piece carrier 3 illustrated in Figure 5 has an eccentric fixing of the cable 8. The eccentric attachment of the cable to the carrier 3, unlike the central attachment of the cable, produces a tilting moment which

during longitudinal displacement of the carrier 3 leads to a somewhat increased friction and thus to higher friction losses. These losses can however be minimised through suitably matching up the materials.

5

With a curved carrier plate 1 it should additionally be observed that the cable connected to the carrier 3 and guided over the cable guide pulleys 5 and 6 at the ends of the guide rail 2 which is shaped out from the base surface of the carrier plate 1 does not intersect the base surface of the carrier plate 1, i.e. there should be adequate distance between the cable guide and the carrier plate 1. This can be clearly seen in Figure 5 through the cable marked by 8' in the case of a curved carrier plate 1.

15

The arrangement illustrated in Figure 5 likewise shows a wet and dry space separation by attaching a permanent adhesive strip 9 on the dry space side of the carrier plate 1 along the guide rail 2 which has been shaped out from the base surface of the carrier plate 1. For this type of wet /dry space separation it is possible to use in place of a simple permanent adhesive strip 9 also any other type of cover part. Figures 6 and 7 show in connection with a single or two-part carrier 3 different forms for covering the guide rail 2 shaped out of the base surface of the carrier plate 1 in order to separate the wet and dry space.

Figure 6 shows a cover for the base of the guide rail in the region of the base surface of the carrier plate 1 using a shaped part 10 which is preferably made from plastics and is inserted in the guide rail 2 which is shaped out from the base surface of the carrier plate 1. This shaped part 10 can be inserted with force-locking or positive keyed engagement into the opening formed by the shaped areas of the guide rail 2.

35

Figure 7 shows the possibility for separating the wet and dry space using a moulded plastics member 11 which bears against the side edges adjoining the opening of the guide rail 2 shaped out from the base surface of the carrier plate 1, and is connected by suitable means, for example by an adhesive or push-fit connection, with the dry space side of the carrier plate 1.

Figure 8 shows a guide rail 2 shaped out from the base surface of a carrier plate 1 and having side grooves 21, 22 which adjoin the base surface of the carrier plate 1. A cover 12 having side projections 121, 122 corresponding to these grooves 21, 22 is inserted into said grooves 21, 22. The stable embodiment of the cover 12 in connection with a cable guide 123 arranged in the region of the window lifter cable 8 produces an extremely stable cover for separating the wet and dry space whilst at the same time guiding the window lifter cable 8. The carrier 3 can be selectively formed in one or two parts according to the previous embodiments and the one-piece embodiment of a carrier according to Figure 9.

Figure 9a shows a plan view of the underneath of a one-piece carrier 3 having an oblong fixing and slide region 30 which is connected through a cylindrical through-axis 300 to the part of the carrier 3 bearing against the outside of the guide rail 2.

This one-piece carrier 3 is inserted from outside of the guide rail 2 into the slot 20 of the guide rail, with the fixing and slide region 30 aligning with the slot 20 of the guide rail 2.

By turning the one-piece carrier 3 about 90 degrees the oblong fixing and slide region 30 moves against the inside

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of the guide rail 2 thereby establishing a keyed connection between the carrier 3 and the guide rail 2 shaped out from the base surface of the carrier plate 1 whilst maintaining the longitudinal displaceability of the carrier 3 relative to the longitudinal extension of the guide rail 2.

For the cover it is possible to use one of the covers described above, for example an adhesive strip or a flat foil 9 which is placed on and then connected to the edges of the guide rail 2 shaped out from the base surface of the carrier plate 1

Figures 10 and 11 show an embodiment of a two-piece carrier before and after the connection of the two constituent parts, which is particularly suitable for connecting with a guide rail 2, 2' shaped in the manner described above from the base surface of the carrier plate 1.

20

The carrier 3 has a window pane socket 37 in which a window pane is inserted and connected to the carrier 3. To compensate tilting movements in the window pane resilient tongues 38, 38' are provided on the underneath of the window pane socket 37. The carrier base body 31 of the two-part carrier 3 has a cable nipple chamber 36 along which runs the dividing line between the carrier base body 31 and a counter member 32, i.e. the two parts 31, 32 which make up the two-part carrier 3.

30

Openings 41, 41' and 42, 42' are provided above and below the cable nipple chamber 6 to hold connecting webs 43, 43'; 44, 44' of the counter member 32 of the carrier 3 which to connect the carrier base body 31 to the counter member 32 engage with detent action in the openings 41, 41' and 42, 42' respectively and which after connecting

35

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the counter member 32 to the carrier base body 31 establish by bending or another way a fixed positive keyed connection between the two parts 31, 32 of the two-part carrier 3 after it has been fitted on the guide rail 2, 2' which is shaped out from the base surface of the carrier plate 1.

A cable opening 39, 40 of the cable nipple chamber 36 is provided between the openings 41, 41' and 42, 42' to receive the cable which is connected in the cable nipple chamber 36 fixedly to the carrier 3 for example through the arrangement of a shaped member fixed on the cable.

The counter member 32 of the carrier 3 preferably consists of a sheet metal angle plate 45 with angled connecting webs 43, 43' and 44, 44' as well as a plastics insert 46 which in the assembled state of the carrier 3 illustrated in Figure 11 bears against the inside of the guide rail 2, 2' which is shaped out from the base surface of the carrier plate 1.

\* \* \* \* \*

New claim 1

05.11.2001

1. Cable or Bowden cable window lifter for motor vehicles  
5 having at least one guide rail (2, 2') with a  
longitudinally aligned slot (20, 20') and mounted on a  
carrier plate (1) of a motor vehicle door, a carrier (3,  
3') holding a window pane and displaceable along the guide  
10 rail (2, 2'), wherein the carrier bears at least in part  
against the outside (21) and the inside (22) of the guide  
rail (2, 2') and engages through the slot (20, 20'),  
reversing devices (5, 5'; 6, 6') mounted at the ends of  
the guide rail (2, 2'), and a cable (8) in active  
15 connection with the carrier (3, 3') and with a drive  
device (7, 70) and guided over the reversing device,

**characterised in that**

the carrier plate (1) itself undertakes the separating and  
20 sealing function and that the open side of the guide rails  
(2, 2') shaped out from the base surface (B) of the  
carrier plate (1) is covered in a manner which provides a  
moisture seal.

New claims

18.09.2001

- 5 2. Window lifter according to claim 1 **characterised in that** the cover (9) is designed flat and is mounted in the plane of the base surface (B) of the carrier plate (1) or the guide rail (2, 2').

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New claims  
18.09.2001

- 5    3. Window lifter according to claim 1 or 2 characterised  
in that the cover comprises a permanent adhesive strip  
(9).
- 10   4. Window lifter according to claim 1 or 2 characterised  
in that the cover consists of a shaped part (10) inserted  
into the inside (22) of the guide rail (2, 2').
- 15   5. Window lifter according to claim 1 or 2 characterised  
in that the cover consists of a shaped member (11)  
connected to the carrier plate (1) and resting on the  
edges of the carrier plate (1) which adjoin the guide rail  
(2, 2').
- 20   6. Window lifter according to claim 1 or 2 characterised  
in that the cover consists of a shaped member (12) which  
can be inserted by side projections (121, 122) into  
grooves (21, 22) of the guide rail (2, 2') which is shaped  
out of the base surface (B) of the carrier plate (1), or  
25   in grooves, slots or hooks on the carrier plate (1), and  
has a cable socket (123) for guiding the cable (8).



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New claims

18.09.2001

- 5     7.     Window lifter according to claims 4, 5 or 6  
characterised in that the shaped part (10) or shaped  
member (11) consists of a moulded plastics part or member.
- 10     8.     Window lifter according to at least one of the  
preceding claims characterised in that the carrier (3, 3')  
is formed in two parts and that the one part (31) of the  
carrier (3, 3') bears against the outside (21) of the  
guide rail (2, 2') and the other part (32) of the carrier  
15     (3, 3') bears against the inside (22) of the guide rail  
(2, 2').
- 20     9.     Window lifter according to claim 8 characterised in  
that the carrier (3, 3') is divided in the region of the  
cable nipple chamber (36) and has two openings (41, 41';  
42, 42') above and below the cable nipple chamber (36) for  
holding the counter member which forms the second part  
(32) of the carrier (3, 3').
- 25     10.    Window lifter according to claim 9 characterised in  
that the counter member (32) is made from a sheet metal  
angle (45) with a plastics insert (46).

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New claims

18.09.2001

11. Window lifter according to at least one of the  
5 preceding claims 1 to 7 **characterised in that** the carrier  
(3, 3') is formed in one piece, that the part (33) of the  
carrier (3, 3') bearing against the outside (21) of the  
guide rail (2, 2') is connected to the cable (8) and that  
10 the part (34) of the carrier (3, 3') bearing against the  
inside (22) of the guide rail (2, 2') is shaped so that  
the carrier (3, 3') can be inserted in the slot (20) of  
the guide rail (2, 2') and can be connected with keyed  
engagement with the guide rail (2, 2') whilst displaceable  
in the longitudinal direction of the guide rail (2, 2').

15

12. Window lifter according to claim 11 **characterised in**  
**that** the cable (8) is connected eccentrically to the  
carrier (3, 3').

20

13. Window lifter according to claim 12 **characterised in**  
**that** the cable (8) is connected to the carrier (3, 3')  
outside of the guide surface produced by the imprinting of  
25 the guide rail (2, 2').

14. Window lifter according to at least one of the  
preceding claims 1 to 7 **characterised in that** the carrier  
(3, 3') is formed in one piece and has a longitudinal  
30 fixing and slide region (30) which after pushing through  
the slot (20) of the guide rail (2, 2') and turning the  
through axis (300) about the transverse axis of the one-  
piece carrier (3, 3') bears on the outside and inside  
respectively against the edges of the guide rail (2, 2')  
35 which adjoin the slot (20) of the guide rail (2, 2').

New claims

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22

15. Window lifter according to at least one of the preceding claims **characterised in that** the cable (8) is  
5 connected centrally relative to the carrier (3, 3') to its cable nipple chamber (36).

16. Cable window lifter according to at least one of the preceding claims for curved carrier plates **characterised in that** the cable (8) running between the reversing  
10 devices (5, 5'; 6, 6') does not intersect the base surface (B) of the carrier plate (1).

15 17. Window lifter according to at least one of the preceding claims for curved carrier plates, **characterised in that** the cable (8) running between the reversing devices (5, 5'; 6, 6') intersects the base surface (B) of  
20 the carrier plate (1) at least in parts and that the cover (9) is formed so that it does not contact the cable (8) at any point.

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New claims

18.09.2001

18. Window lifter according to at least one of the  
5 preceding claims **characterised in that** the upper and lower  
end regions (2a, 2a'; 2b, 2b') of the guide rails (2, 2')  
are formed like ramps.
- 10 19. Window lifter according to at least one of the  
preceding claims **characterised in that** the guide rails (2,  
2') are formed curved in the longitudinal direction  
relative to the base surface of the carrier plate (1).
- 15 20. Window lifter according to at least one of the  
preceding claims **characterised in that** the carrier plate  
(1) is provided with additional guide slots and/or guide  
elements shaped out of the base surface (B) of the carrier  
20 plate (1) to hold slide or fixing elements connected to  
structural parts of elements of a vehicle door, more  
particularly arm rests.
- 25 21. Window lifter according to at least one of the  
preceding claims **characterised in that** the imprint of the  
guide rail (2, 2') is formed by deep drawing or stamping a  
metal carrier plate (1) or by injection moulding or  
thermoforming a plastics carrier plate (1).

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New claims

18.09.2001

22. Window lifter according to at least one of the  
5 preceding claims characterised in that the side edges of  
the carrier plate (1) are connected sealed against  
moisture to a carrier plate socket of the vehicle door.

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